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last summer, which he had attended. The congress, which was summoned by the Principals of McGill University and the University of Toronto, was attended by representatives of fifteen of the nineteen universities in the Dominion. The representatives of the universities of Alberta and Manitoba were prevented from attending at the last moment, and only two of the smallest universities failed to accept the invitation. Dr. Roberts reported that in addressing the Canadian conference he had instanced, as a few of the questions which seemed to be demanding attention, the following: The first was whether any common understanding was possible among the universities of the empire as to the extent to which they could recognize each other's entrance examinations; another was the desirability of increased facilities for post-graduate study; a third, the possibility of some plan for interchange of professors; a fourth, what could be done by universities in regard to the after-careers of their students. There was, further, the whole question of the financial support given from public sources to universities in the British Empire, as compared with the provision for university education made in other countries. There was finally the suggestion, made by Principal Peterson and others, that a central bureau should be formed to furnish information to the universities of the empire upon these and other questions. The principal of Toronto University reported that it had appointed a committee which was carefully considering the list of subjects which should be brought before the congress, and the conference finally decided to appoint three committees, one for the western provinces, another for the maritime, and a third for the central provinces. In conclusion Dr. Roberts stated that from conversations with the heads and professors of universities in the eastern parts of Canada, which alone he had leisure to visit, he had formed the impression that the question of enlarged facilities for post-graduate study was regarded as of prime importance from the Canadian point of view. The University of Sydney has appointed Earl Beauchamp, formerly visitor of the univer-

sity; Professor Anderson Stuart, dean of the faculty of medicine; Professor Warren, dean of the faculty of engineering, and Mr. H. E. Bartff, registrar, as delegates to represent it at the congress next year. The Home Committee has appointed a subcommittee to draw up a detailed program for the consideration of a meeting of the full committee on November 4. Inquiries with regard to the congress should be addressed to Dr. R. D. Roberts, at the Congress Office, University of London, South Kensington, London, S. W.—*British Medical Journal*.

TECHNICAL JUDGES

JUDGES continue to protest against the absurdity of their being called upon to pass upon highly technical and scientific questions. Thus Judge Hand, in the course of an opinion which he rendered in a case involving patents in the manufacture of chemicals, took occasion to remark:

"I can not stop without calling attention to the extraordinary condition of the law which makes it possible for a man without any knowledge of even the rudiments of chemistry to pass upon such questions as these. . . . In Germany they do quite differently. There the courts summon technical judges to whom technical questions are submitted and who can independently pass upon the issues without blindly groping among testimony wholly out of their ken. How long we shall continue to blunder along without the aid of unpartisan and authoritative scientific assistance in the administration of justice, no one knows, but all fair persons not conventionalized by provincial legal habits of mind ought, I should think, to unite to effect some such advances."

The need of such a reform as Judge Hand here urges has often been argued. We should not forget, however, that it is possible to meet the difficulty, in part at least, by extra-judicial means. In point is the plan favored by the New York Chamber of Commerce for settling commercial disputes by arbitrators selected from an official list. This plan provides for the disposal of technical questions arising in business by men peculiarly qualified by rea-

son of their experience. As the list covers men in all lines of business and industry, it is no longer absolutely necessary to submit such questions to untrained jurors, or to judges without special fitness to pronounce upon them.—New York *Evening Post*.

SCIENTIFIC BOOKS

Life and Scientific Work of Peter Guthrie Tait. By DR. C. G. KNOTT. Cambridge University Press, 1911.

The volume before us supplements the two volumes of "Scientific Papers" published by the same press in 1898 and 1900, under the supervision of Tait himself. For the preparation of this volume Professor Knott was well qualified, having been a pupil, colleague and friend of Tait; and he has made excellent use of the material placed at his disposal, giving full and interesting information about the relations of Tait to the other great mathematicians and physicists of his time.

The author does not follow the chronological order, but divides his material with some logical redundancy as follows: Chapter I., Memoir; II., Experimental Work; III., Mathematical Work; IV., Quaternions; V., Thomson and Tait's Natural Philosophy; VI., Other Books; VII., Addresses, Reviews and Correspondence; VIII., Popular Scientific Articles. Appended is a bibliography of Tait's writings.

In his early years Tait became enamored of pure science, and he clung to that ideal throughout life. He was a very brilliant pupil at the Edinburgh Academy, where he had Maxwell for schoolmate and special friend; he did not, like Maxwell, study at the University of Edinburgh, but went straight to the University of Cambridge, where he graduated as senior wrangler; he was for six years professor of mathematics at Belfast, and for forty years professor of natural philosophy at Edinburgh. His manner of life at Edinburgh was simple. During the winter term he was much occupied with lecturing, in which he was singularly clear and inspiring; during the summer term he devoted much time to experimental investigation in the lab-

oratory; the long and the short vacations he spent at St. Andrews, where there is a famous golfing course; both summer and winter it was his custom to work to late hours in his library.

One of the most elegant of Tait's investigations, combining mathematical, experimental and technical skill, dealt with the phenomena of golf. I remember that when I was an instructor in the laboratory, American students used to describe the curves of a baseball and ask for the explanation; I doubt whether Professor Tait at that time could give an adequate explanation. But it is different now; his investigation of the path of the golf ball applies also to the phenomena of baseball and of tennis, and is full of interest to scientific players.

Tait's greatest contribution to mathematical analysis undoubtedly consists in his advocacy and development of the quaternion method invented by Hamilton. At the time when Hamilton was about to publish his "Lectures on Quaternions," his friend De Morgan suggested the names of a very few mathematicians on whom a presentation copy would not be thrown away; one of these was Professor Thomson, afterwards Lord Kelvin. Doubtless the advice was acted on, but for some reason Thomson formed an unfavorable opinion, to which with his characteristic tenacity he clung ever afterwards. On the other hand, Tait, having just graduated, was curious enough to buy a copy, and on perusal became convinced that the method contained possibilities of highly useful application to mathematical physics. It was through Tait that Maxwell became an earnest student, and it is evident from the correspondence here printed that Maxwell was one of the first vector-analysts. The book before us throws much light on the relations of these three great Scotsmen to one another, and on the relation of Tait to Hamilton.

The fifth chapter gives authentic information about the preparation of the celebrated "Treatise on Natural Philosophy." The idea was due to Tait, and some advance in its realization had been made before Thomson